

## WE CLAIM:

1. An electronic tripping device for low-voltage circuit-breakers, in particular for low-voltage multipolar automatic circuit-breakers, comprising means for detection and calculation of a ground-fault current operatively connected to tripping means of said circuit-breaker, said means for detection and calculation comprising:
  - current-sensor means that supply, for each pole, a signal proportional to the current circulating therein;
  - means for detection of the sign of the current, the input of which is operatively connected to said current-sensor means, which, for each pole, supply at output a two-level signal representing the sign of the current in said pole;
  - current-rectifying means, the input of which is operatively connected to said current-sensor means, which, for each pole, supply at output a rectified signal proportional to the current circulating in said pole; and
  - first numerical-processing means, the input of which is operatively connected to said means for detection of the sign of the current and to said rectifying means, said first processing means supplying at output, with a predetermined periodicity, a value with sign representing a ground fault by means of a numerical-processing operation that comprises multiplication for each pole of said two-level signal with the corresponding rectified signal proportional to the current circulating in said pole.
2. The electronic tripping device according to Claim 1, further comprising means for detection of the amplitudes, the input of which is operatively

connected to said rectifying means, which supply at output a voltage signal proportional to the current signal detected by said sensor means.

3. The electronic tripping device according to Claim 1, further comprising second numerical-processing means, the input of which is operatively connected to said first numerical-processing means, said second processing means executing a numerical-processing operation of said value with sign representing a ground fault for reconstructing the effective value RMS of said ground-fault current.
4. The electronic tripping device according to Claim 3, wherein said second numerical-processing means generate, on the basis of said effective value RMS of the current, a tripping signal according to pre-set tripping curves.
5. The electronic tripping device according to Claim 2, further comprising sampling means, the input of which is operatively connected to said means for detection of the amplitudes, which enable synchronous sampling of all the phases by sending, with a predetermined periodicity to said first numerical-processing means, rectified signals proportional to the current in each pole.
6. The electronic tripping device according to Claim 5, wherein said rectified signals proportional to the current in each pole are multiplied by the corresponding two-level signal representing the sign of the current in each pole, obtaining for each pole values with sign that are proportional to the current circulating therein.
7. The electronic tripping device according to Claim 6, wherein said values with sign proportional to the current in each pole are obtained by implementing a twos-complement mathematics, dedicating one bit to obtain a number with sign.

8. The electronic tripping device according to Claim 6 or Claim 7, wherein said first numerical-processing means comprise means for obtaining the algebraic sum of said values with sign proportional to the current in each pole, said means for obtaining the algebraic sum supplying a value with sign that represents a ground fault.